

FINAL REPORT

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ANALYSIS OF STALLING PROBLEMS


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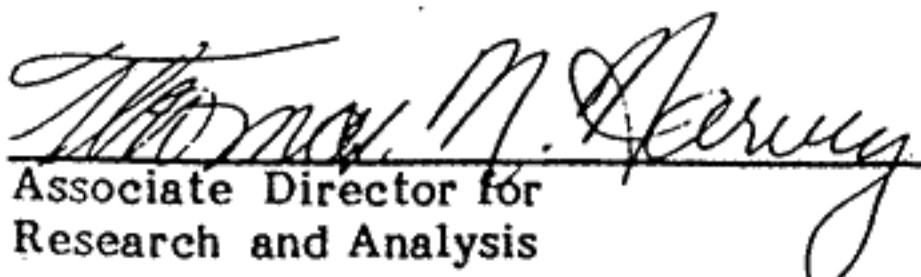
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## EXECUTIVE SUMMARY

The National Highway Traffic Safety Administration (NHTSA) Office of Defects Investigation (ODI) collects consumer complaints concerning alleged vehicle safety defects for the purpose of analyzing and investigating significant problem areas. It also influences recalls of vehicles with specific safety-related defects.

This analysis addresses general stalling as a potential safety problem. Since 1975, NHTSA has received over 17,000 consumer complaints associated with stalling problems, and has conducted several investigations of vehicle stalling problems, including the 1982 Volvo, 1976-1982 VW Rabbits, and the 1976-1977 Aspen/Volare.

The purpose of this project was to: (1) review the data available to NHTSA for patterns which could yield insight concerning the safety implications of stalling; (2) identify high-risk stalling situations; and (3) attempt to identify high-risk vehicles/components.

Two approaches were undertaken to examine the safety implications of stalling problems. First, complaints and accident rates per 100,000 vehicles registered were compared to a sample of investigations, some of which were closed without action, and some of which resulted in recalls. Additionally, complaint data from the automated file and from hard copy accident records were analyzed to determine which vehicle characteristics and stalling circumstances were related to serious safety problems (i.e., accidents and injuries). The major findings from the safety analysis indicate that:

- o The number of complaints registered per year since 1980 is lower than the peak years of 1975-1978. The rate of complaints per 100,000 registered vehicles has not changed significantly from earlier periods.
- o Overall, the rate of stalling complaints is comparable to the rate of complaints for other safety defect investigations. The rate of stalling-related accidents is lower than that in most investigations that have led to recalls.
- o Stalling incidents that occur without warning, at high speeds, or upon acceleration are associated with stalling-related accidents more frequently than other types of stalling problems. For example, loss of power steering or brakes due to stalling is cited as a common accident cause.

Vehicles with high rates of stalling complaints were identified by dividing the total numbers of stalling complaints for each vehicle model by the number of these vehicles registered in 1984, the latest year where detailed registration data were available. Vehicle makes with complaint rates that were significantly higher than the average for all vehicle makes were identified. An analysis was conducted on vehicles sold in model years after 1980 as well as for the entire 1975-1985 time period.

Engine systems with high rates of complaints were identified in a similar manner; however, this analysis was restricted to complaint data that included valid vehicle identification numbers (VIN or Vindicator Classification). The "engine code" digit contained in the VIN numbers and the vehicle's model year were used to classify engines into different types (number of cylinders, displacement, carburetion, fuel type) and subtypes (other less pronounced engine differences probably associated with emission control changes). The number of complaints for each engine divided by the number of vehicles with that engine that were registered in 1984 was used as a measure of complaint frequency.

Stalling complaints by manufacturer are shown in the following table:

Stalling Complaints by Manufacturer  
(1975-1985)

	<u>Number of Complaints</u>	<u>Complaints Per 100,000 Registrations</u>
Chrysler	5,766	48.5
GM	4,907	9.7
Ford	2,621	11.5
AMC	434	18.3
Foreign-European	1,563	19.3
Foreign-Japanese	911	6.4
Trucks and Other	<u>1,215</u>	<u>3.8</u>
<b>TOTAL</b>	<b>17,417</b>	<b>12.3</b>

Specific vehicle makes with the highest rates of complaints are the Aspen/Volare, Dart, Monaco, Pacer and Omni/Horizon (1975-1985 period); and the Aries/Reliant, Omni/Horizon, Phoenix/Citation/Skylark, Thunderbird, and Escort/Lynx (post-1980 model years).

Engine systems with particularly high rates of consumer complaints include the Chrysler 6 cylinder - 225 cubic inch (1 and 2 barrel), the GM 4 cylinder - 97 cubic inch (1 barrel), the Chrysler 4 cylinder - 105 cubic inch (2 barrel), the Chrysler 8 cylinder - 400 cubic inch (2 and 4 barrel), the Audi 4 cylinder - 1.5 and 1.9 liter engines, and several small VW 4 cylinder engines.

Even with the use of all available data elements, it was not possible to conclusively establish the entire range of stalling circumstances and conditions which might constitute serious safety hazards. A list of additional data elements (see below) and methodology that would facilitate the identification of important defect-related safety problems is provided.

#### Data Elements Potentially Associated With Stalling Accidents

1. Weather conditions
2. Time of day
3. Ambient temperature
4. Time from start to first stalling incident
5. Vehicle in motion
6. Vehicle speed
7. Vehicle under acceleration
8. Loss of power steering or power brakes
9. Delay in restarting
10. Stalling with or without warning
11. Vehicle mileage
12. Road type (stalling location)
13. Driver characteristics